



To: Alan Humphrey, ERT Work Assignment Manager

From: Dennis Miller, Lockheed Martin REAC Analytical Section Leader, Ph.D.

Subject: Response to Comments in Report of Findings, Review of the Sam Winer Motors Site, Akron, Ohio

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Work Assignment: 0-177, Sam Winer Property

Lockheed Martin REAC scientists carefully and thoughtfully reviewed the TOSC Report of Findings for the Sam Winer Motors site; the REAC scientists disagree with several of the TOSC conclusions relating to sample analyses performed by REAC organic analytical chemists. Within this context, brief responses are presented below for TOSC conclusions which REAC scientists consider to be incorrect and/or inaccurate.

Comments from TOSC Conclusion 4: High on-site contaminant levels should be investigated

TOSC questions the reported MDLs from the Analytical Report from which the Bussey memo was based on (*Analytical Report*, prepared by Lockheed Martin, Inc. dated March 2001, prepared by D. Miller). Within the *Analytical Report*, the method detection limits for samples are the same for numerous chemicals. For example, sample # 18443 (p. 027) showed a method detection limit of 1.1 mg/Kg for 59 out of the 64 chemicals analyzed. Method detection limits depend on individual chemical properties, the analysis method as well as other variable. It is extremely unlikely that multiple chemicals will have the same detection limit. The fact that 59 out of 64 chemicals analyzed show the same detection limit cast doubt on the validity of those results.

REAC Response:

In the REAC Sam Winer Site Analytical report, the method detection limit (MDL) units for sample #18443 and all other soil samples are $\mu\text{g/kg}$ not mg/kg as quoted by the TOSC reviewers; the 1000-fold MDL unit error is troubling. REAC method detection limits (MDLs) are measured and calculated using procedures specified in Appendix B to Part 136- Definition and Procedure for the Determination of the Method Detection Limit- Revision 1.11 found on pages 198 and 199 of the Federal Register, Vol. 49, No. 209, October 16, 1984. Per the Federal Register, the MDL is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte. The Federal Register MDL procedure was designed for applicability to a broad variety of physical and chemical methods. To accomplish this, the procedure was made device or instrument independent.

REAC MDLs are measured and calculated in the following manner. Seven to 10 aliquots of reagent water or sand that is as free of the analyte(s) as possible are spiked with a known level of analyte(s); the spiked aliquots are processed through the entire analytical method. All computations are made according

to the defined method and final sample results are given using method reporting units. The variance and standard deviation of the replicate measurement are calculated using equations specified on page 198 of the Federal Register. The MDL is computed using the equation $MDL = t \times S$ where t is the student's t value appropriate for a 99% confidence level and a standard deviation estimate with $n-1$ degrees of freedom and S is the standard deviation of the replicate analyses. For volatile organic compounds (VOCs), MDL values are initially calculated to two significant figures; the calculated MDL is rounded to the nearest whole number for reporting purposes and appears as a whole number 1.0, 2.0, 4.0 and 8.0 in analytical reports and REAC VOC analysis SOPs. The actual MDL for a VOC analyte is usually less than the reporting MDL. For most VOC target analytes, the actual MDL is less than 1.0 $\mu\text{g/L}$ for water samples and 1.0 $\mu\text{g/Kg}$ for soil samples without percent solids correction. Thus, 59 out of 64 VOC target analytes have the same reporting MDL of 1.0 $\mu\text{g/Kg}$ for soil samples assuming 100% solids and 1.0 $\mu\text{g/L}$ for water samples.

In most CLP (contract laboratory program) organic analysis methods, the CRDL (contract required detection limit) is the same for nearly all target analytes within the same analyte class (VOC, SVOC, pesticide/PCB, etc); similarly for most SW-846 organic analysis methods, the quantitation limit is the same for most target analytes within the same analyte class. For REAC VOC analyses, the single digit reporting MDL is analogous to a CRDL or quantitation limit.

In addition to multiple chemicals being reported to have the same detection limits, the reported detection limits in many cases within the *Analytical Report* are unacceptably high. An example of this is sample # 18440 (p. 025), which showed a method detection limit of 1,900 mg/Kg for all 65 chemicals. Detection limits in the gram per kilogram range significantly decreases the utility of these results.

REAC Response:

It appears that the TOSC reviewers have made another 1000-fold error for the MDL units. For sample # 18440 (p. 044 of the REAC Analytical report, not p.025), the MDL is 1,900 $\mu\text{g/Kg}$ or 1.9 mg/Kg (0.019 g/Kg) for all 65 BNA (base neutral acid extractable) target analytes; the BNA MDLs are not 1,900 mg/Kg as incorrectly quoted by the TOSC reviewers. For sample # 18440 and the other soil samples, the sample extracts were only concentrated to a final volume of 5.0 mL or 10.0 mL rather than 1.0 mL due to viscosity concerns or high analyte levels and, thus, the sample MDLs are slightly elevated by a factor of 5 or 10. If the sample extracts had been concentrated to 1.0 mL, the REAC BNA MDLs would have the same concentrations as the CLP BNA CRDLs and SW-846 BNA quantitation limits. The reported BNA MDLs are not unacceptably high and are certainly are not in the gram per kilogram range as erroneously quoted by the TOSC reviewers who seem to be basing their conclusions on a serious 1000-fold error for the MDL units.

Further skepticism is cast on the validity of results obtained for base-neutral compounds in soil. Aside from detection limit problems, there are no analytical methods cited. Since contractors for the U.S. EPA performed analytical testing, the appropriate EPA methods should have been reported.

REAC Response:

As discussed above, there are no VOC or BNA detection limit problems; what the TOSC reviewers characterize as problems appears to result from their 1000-fold MDL unit error. ERT (EPA) approved REAC SOPs # 1804, *Routine Analysis of Semivolatiles in Water by GC/MS*, and #1805, *Routine Analysis*

of Semivolatiles in Soil/Sediment by GC/MS, were used for BNA analysis of water and soil samples, respectively. The REAC BNA analysis SOPs are based upon modified approved EPA methods. ERT approved REAC SOPs # 1806, *Volatile Organic Analysis in Water by GC/MS* and #1807, *Volatile Organic Analysis in Soil/Sediment by GC/MS*, were used for VOC analysis of water and soil samples, respectively. The REAC VOC analysis SOPs are based upon modified approved EPA methods.

Due to the wide array of chemicals found on the site, some at extremely high levels, TOSC recommends that the site be more thoroughly investigated utilizing appropriate analysis methods and any future decisions be based on quality analytical data.

REAC Response:

Appropriate REAC analysis methods were used for water and soil VOC and BNA sample analyses. The sample analyses were performed by well qualified experienced REAC organic analytical chemists. The analysis data were reviewed and validated using standard EPA procedures; high quality data were provided for all samples. A 1000-fold error may seem trivial to some people, but the distinction between ppm and ppb is very important for trace level organic analyses. For this reason, REAC scientists have concerns about the quality of the comments and conclusions in the TOSC report for the Sam Winer Motors site.